Introduction

INTEGRAL's science operations budget approved until 31 Dec 2012

New extension request in Fall 2010 with new financial request for 2012+ should contain:

- Science case
- Brief technical status report on flight & ground segments
- Budget (request for CaC update, 2012+) and items of cost reduction

Science Case

Consider recommendations from AWG and SSAC fm previous request:

- Strengths
  - "INTEGRAL continues to provide a unique facility for studying the high energy sky, in particular thanks to its spectral capabilities, with no replacement currently planned"
  - "An extension would enable new and interesting science"
  - "….producing science of high quality"
- Weaknesses
  - "Community making use of INTEGRAL is smaller than for other missions (e.g. XMM-Newton or HST)"
  - "Resulting science [compared to XMM/HST] is of a somewhat less broad nature"
  - "…would like to see a clearer account on where extended measurements will be most productive, beyond statistical √ (time) improvements. What will be learned from extension ? Avoid focus of incremental science" (PS: this bullet not included in final recommendation, but reported fm AWG attendees)

Science Case

Science case presentations were made in 2003, 2005, 2007, 2008 using a collection of some science highlights (selected by CW + IUG support)

Change approach next time by focusing more on:

- Clearer account on where extended measurements will be most productive, beyond statistical √(time) improvements.
- What will be learned from extension ?
- Avoid focus of incremental science
- Apply these items to each of the large science areas (see below)

(However, keep a very brief summary of recent science highlights and the usual pub/prop stats)

Propose to nominate "godfathers" from IUG, for each of the main science areas (compact stellar-size objects, nucleosynthesis and lines, extragalactic & CDB) to

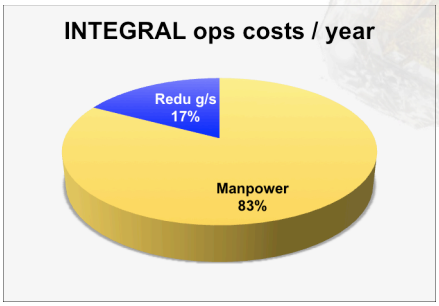
- support preparing the case for each area (see above), and to
- provide suggestions how to tackle
  - "small community" and
  - "less broad nature of science"

Operations costs

SPC re-confirmation for most of the 8 missions is currently pending (see AP's presentation) and - meanwhile - projects were asked to look into identifications of cost savings options (~ 20%) again.

Before merging the two XMM and INTEGRAL ops teams into one, INTEGRAL-alone operations costs were ~ 8.7 M€/year (AP presentation to AWG in Oct 2007)

(PS: this is equivalent to one month of Herschel/Planck launch delay and about 3% of the science budget problem)



+ INTEGRAL ops costs are low
- Where can we save money other than in g/s or manpower ?

Operations costs

Redu g/s (B) is, with about 1.5 M€/year, a large single cost item which could be considered as a cost saving item (up to 20%). Costs are charged per hourly usage. INTEGRAL is the only customer 24/7 .

Options to reduce the current 24/7 usage of Redu:

1. Using a Russian ground station for TBD part of the orbit,
2. Increase Goldstone coverage if possible,
3. Cost optimize the usage of Redu, Russian g/s and Goldstone

4. Switch off payload for TBD hours/orbit (probably no cost savings as station runs idle)
5. No reaction to TOO's outside working hours Mon-Fri (see 4. above)

Note that #1- #3 could save up to 20% and do not impact science performance. #4 and #5 probably don't save costs, but cut into science.

But, need to maintain Redu (B) for political reasons?

Russian ground station

A Russian ground station for INTEGRAL'S TC/TM "status quo"

- would provide a visible contribution of the Russian community to the operations of the mission beyond it's nominal duration, and
- could possibly be an important "moral" help in the discussions for extension.
- was studied previously and is technically feasible (installation costs for ESOC of ± 350 k€/TBC),
- but was thereafter not further considered by ESA (letter D/SRE, 15 Jan 2008 to Roscosmos/Yuri Nosenko)
- Russian community supported study & is in "stand-by" after 15 Jan 08
- Russian science community is a major INTEGRAL customer/partner
- In my view, ESA should consider "re-activating" the option -- are the Russian partners still interested ?